

RHIC d-Au Setup Plan

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1 Pre-Cool-Down

1. Check all power supplies, controls, and readbacks.
(Don Bruno)
2. Condition all cavities for operating voltage.
(John Butler, Alex Zaltsman)
3. Test abort system and evaluate kicker stability against misfires.
(Jianlin Mi, Leif Ahrens)
4. Setup AGS Extraction and ATR Transport of deuterons and gold ions (see “RHIC Run-8 Startup Schedule and Tasks”).
(Nick Tsoupas, Woody Glenn, Operations)

2 Cool-Down Mode

Begins in Blue on **Thur 1 Nov.**

Inject deuterons into Blue by **Thur 8 Nov.**

Evening and nighttime beam in Blue.

Yellow cold (4K) by **Mon 12 Nov.**

Experimental magnets OFF.

1. Setup AGS-to-RHIC synchro.
(RF Group)
2. Setup AGS extraction, ATR transport, and X and Y arc transport.
(Nick Tsoupas, RHIC Operations)

3. Setup injection when Blue is cold and magnets are ready (with or without hysteresis ramp).
([RHIC Operations](#), [Wolfram](#))
 - (a) Inject first with kicker OFF (bo6-tv9 and yo5-tv9 to 1.3 mrad).
 - (b) Check for obstacles; establish first-turn and coasting beam.
 - (c) Setup injection with kicker ON; adjust timing.
 - (d) Minimize injection losses (goal: less than 10%).
 - (e) Optimize beam lifetime; prepare for RF work.
4. Setup RF capture; establish optimum voltage.
([RF Group](#))
5. Blue magnet and ramp setup.
([Don Bruno](#), [Carl Schultheiss](#), [Steve Tepikian](#))
 - (a) Check out cold magnets.
 - (b) Train DX magnets.
 - (c) Establish hysteresis to $\gamma = 108.72$.
 - (d) Confirm ramp and quench protection software.
 - (e) Exercise ramps.
6. Instrumentation setup.
 - (a) Setup BPM timing. ([Todd](#))
 - (b) Tunemeter (Artus). ([Angelika](#))
 - (c) Injection damper. ([Todd](#))
 - (d) Schottky (low and high frequency). ([Kevin Brown](#))
 - (e) BBQ, BTF. ([Al Dellapenna](#))
 - (f) WCM. ([Roger Lee](#))
 - (g) IPM. ([Roger Connally](#))
7. Yellow magnet and ramp setup.
([Don Bruno](#), [Carl Schultheiss](#), [Steve Tepikian](#))
 - (a) Check out cold magnets.
 - (b) Establish hysteresis to $\gamma = 107.4$.
 - (c) Confirm ramp and quench protection software.

- (d) Exercise ramps.
8. Chromaticity “knob” development (without beam) in yellow at injection.
([Christoph Montag](#))
 9. The yellow dipole radial feedback system needs setup time without beam. (This is feedback on the yellow main dipole to maintain desired radius around transition).
([Carl Schultheiss](#))
 10. Beam halo study at injection (2 blocks of 4 hours in each ring). Can be done in blue before yellow is cold.
([Angelika](#))
 11. Orbit Response Matrix (ORM) at injection. Requires timed-in BPMs. Can be done in blue before yellow is cold.
([Todd](#))
 12. Transverse injection matching. Can be done in blue before yellow is cold.
([Todd](#))
 13. IPM channel calibration.
([Roger](#))
 14. Beam based alignment. Take data, analyze offline, and determine offsets.
([Todd](#))

3 Setup Mode

10 days starting **Mon 12 Nov**.

3 (eventually 2) shifts per day.

Nights for experiments.

1. Establish yellow injection, circulating beam, bunched beam and good lifetime.
([All](#))
2. Instrumentation setup.

- (a) Setup BPM timing. (Todd)
 - (b) Tunemeter (Artus). (Angelika)
 - (c) Injection damper. (Todd)
 - (d) Schottky (low and high frequency). (Kevin Brown)
 - (e) BBQ, BTF. (Al Dellapenna)
 - (f) WCM. (Roger Lee)
 - (g) IPM. (Roger Connally)
3. Machine tuning.
- (a) Orbit correction. (Vadim)
 - (b) Bend trim, orbit radius. (Vadim)
 - (c) Decoupling. (Yun)
 - (d) Chromaticity. (Steve Tepikian)
 - (e) Optics measurements. (Mei, Todd)
4. Chromaticity “knob” development in yellow at injection.
(Christoph Montag)
5. BBQ feedback development.
(Pete Cameron, Carl Schultheiss, Al Dellapenna, Yun)
6. Ramp development.
- (a) Setup ramps with 6 bunches.
 - (b) Blue intensity $\approx 0.2 \times 10^{11}$ d per bunch.
 - (c) Yellow intensity $\approx 0.2 \times 10^9$ Au ions per bunch.
 - (d) Use scaled corrector settings for injection and early ramp; then propagate.
 - (e) Setup radial loops.
 - (f) Try BBQ tune and coupling feedback.
 - (g) Setup orbit corrections along the ramp.
 - (h) Setup transition crossing timing and chromaticity jump.
Octupoles?
 - (i) Transition monitor development.
 - (j) Decoupling along the ramp.

- (k) Chromaticity along the ramp.
 - (l) IR orbit separation. Longitudinal separation.
 - (m) Bring on Phenix and Star magnets; adjust ramp.
7. Store development.
- (a) Blue intensity $\approx 1.0 \times 10^{11}$ d per bunch.
 - (b) Yellow intensity $\approx 1.0 \times 10^9$ Au ions per bunch.
 - (c) Establish collisions; DX BPM timing.
 - (d) Store optics:
 - i. Orbit correction.
 - ii. Decoupling.
 - iii. Chromaticity.
 - iv. Dispersion function measurement and correction.
 - v. IR nonlinear corrections.
 - vi. Betatron tune scans; working point scans.
 - vii. Optics measurements (AC dipole).
 - (e) Collimation setup.
 - (f) Gap cleaning setup.
 - (g) 10 Hz feedback.
 - (h) Store-to-store reproducibility.
 - (i) rebucketing.

4 Ramp-Up Mode